

INSTALLING and OPERATING

Hypro® Piston Pumps

Maximum Operating Temperature = 140° Fahrenheit

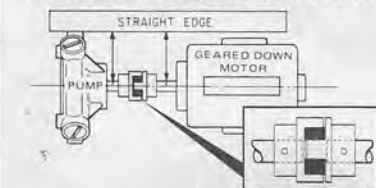
Except Series 5000 (Model 5041AC) — 180°F

SERIES — 5000, 5200, 5300,
5400 and 5500.

INSTALLATION

SEE PUMP MOUNTING DIMENSIONS INSIDE

FLEXIBLE COUPLING DRIVE



FLEXIBLE COUPLING
Shaft ends must not touch

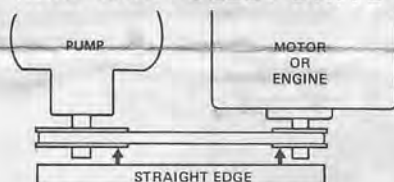
**INSTALL SAFETY SHIELD
OVER SHAFT & COUPLINGS**



CHAIN COUPLING
RECOMMENDED FOR
LARGE PUMPS, SUCH
AS SERIES 5400.

Fig. 1

BELT AND PULLEY DRIVE



BE SURE THAT PULLEYS ARE IN LINE

**INSTALL SAFETY SHIELD
OVER BELTS/PULLEYS**

FOR LARGE
PUMPS USE
MULTIPLE
BELTS.

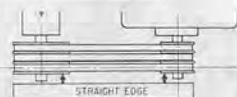
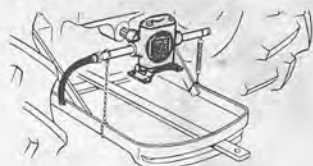
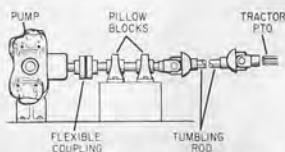


Fig. 2

TYPICAL DRIVE EXAMPLES



PTO DRIVE (5200)



TUMBLING ROD DRIVE (5400)

Fig. 3

FLEXIBLE COUPLING DRIVE

First—slide coupling ends onto motor/engine and pump shafts as far as possible. (Fig. 1) Mount motor/engine and pump onto base—shimming pump or power unit so that shafts are aligned. Leave enough space between ends of shafts to allow coupling disc to be inserted. When alignment is made, slide coupling ends over coupling disc. Leave clearance between coupling ends and center disc. Tighten screws in both coupling ends. For electric motor drive, use couplings rated at least twice the horsepower required to operate pump. For gas engine drive, select couplings rated at three times the required pump horsepower. NOTE: Chain coupling recommended for Series 5400 pumps. (Fig. 1) CAUTION: For safety, install a shield over rotating shafts and couplings.

BELT AND PULLEY DRIVE

Use when reduction of speed is desired (as in the case of pumping liquids heavier than water). Do not belt drive hollow shaft models — use solid shaft models designed for belt and pulley or flexible coupling drive. Mount pulleys as close to pump and motor engine shaft bearings as possible. Make sure that belt has proper tension (belt

too tight will cause bearing wear, belt too loose will cause slippage). Multiple V-belt drive is recommended for large pumps such as the Series 5400. Check with belt and pulley supply sources for specific recommendations.

To figure proper diameter of pump pulley: Multiply motor/engine RPM by diameter of the motor/engine pulley and divide that figure by desired pump speed.

DIRECT DRIVE

Hollow shaft models mount directly on power shaft — motor or engine shaft, truck or tractor PTO shaft. (Fig. 3) Adapters are available to convert some solid shaft models for direct shaft mounting. After mounting pump, always turn it by hand to make sure pump is operating freely. Do not apply power to pump that appears to be stuck.

IMPORTANT: Use a torque arm to keep pump from rotating with the shaft. If necessary, secure torque arm with a chain or flexible fastener tied to frame or base directly below or in line with torque arm. Pump must be allowed to “float” on the shaft. See figure 3 for examples.

NOTE: Series 5400 pump not recommended for direct PTO shaft mounting. Use “tumbling rod” connection as shown in figure 3.

DO NOT PUMP chlorine, acids or abrasive solutions such as copper salts, soluble copper sulphate, chlorides of mercury or liquids containing sand or other sharp grit suspensions. Harsh abrasives will cause rapid wear of pistons and/or piston cups. For viscous liquids or special chemicals, consult factory. See chart on page four for recommendations on liquids that can be pumped with different piston (cup type) pumps (Series 5200, 5300, 5400 and 5900). For plunger pumps (Series 5000 and 5500) consider equivalent to rubber piston cup type. In most instances, the above liquids can be handled satisfactorily downstream of the pump. Consult factory for such system information.

HOSE

Selection of the right size and type of hose is vital to good performance. Be sure to hook up to proper ports on pump (note markings “IN” and “OUT” on pump castings).

SUCTION HOSE

Always use genuine suction hose of at least the same inside diameter as pump ports. For example, use 3/4” (ID) hose for a Series 5200 pump or 1 1/2” (ID) hose for a Series 5400 pump. If suction hose is over 4 feet long on Series 5200, 5300, or over 10 feet long on Series 5400 and 5500, use next

larger size hose. Keep suction hose as short as possible and restrictions such as elbows, check valves, etc. at a minimum.

DISCHARGE HOSE

High pressure pumps require the use of special high pressure discharge hose (2 rayon braid or equivalent). Use a hose rated at least 50% greater than the highest operating pressure required of pump. Example: If required pump pressure is 200 psi, use discharge hose rated at minimum of 300 psi working pressure.

PISTON PUMP INSTALLATION

Accessories should be installed with solid piping and be mounted as close to the pump as possible. Hose must be used right after accessories. **NOTE:** If remaining installation is solid piping, a two to four foot length of hose must be installed between accessories and solid piping.

UNLOADER VALVE

The unloader has a very important safety function in your piston pump hook-up. The unloader valve protects the pump by unloading pressure when gun is shut off or discharge is otherwise blocked. This saves pump and power because the liquid is by-passed at a very low pressure.

STRAINERS

Use a suction line strainer with at least 3 to 5 times the suction port area. For example — an area of approximately 2-1/3 to 4 square inches for a 1" suction port. Be sure the screen is suitable for the liquid being pumped. Keep filter clean ... a clogged strainer will cause cavitation, which usually leads to poor performance and wear of pump parts.

VACUUM GAUGE (Optional)

Pump should not be subjected to high suction line vacuums. To check on this, install a vacuum gauge at pump inlet. Generally, it should not read over 5 inches of mercury. High vacuum readings can indicate the following problems:

- 1) Strainer is clogged.
- 2) Screen is too fine for liquid being pumped.
- 3) Suction line is restricted.
- 4) Suction line has collapsed, or inside diameter is too small.
- 5) Suction line is too long.
- 6) Pump is being operated too fast for the viscosity of liquid being pumped.
- 7) Pump is too high above liquid source.

SUCTION LINE SHUT-OFF

As shown in the top hook-up diagram at right, this suction line accessory is generally used where there is pressure feed. Be sure valve is open before starting pump.

PULSATION DAMPER

This device absorbs the shock and smooths out the pump discharge pulsations, providing smoother operation. Install immediately after the unloader valve in discharge line.

PRESSURE REGULATOR

Use a pressure regulator to limit incoming pressure to 20 psi when equipped with a suction side injector. Volume, pressure and horsepower figures in pump performance tables do not apply when incoming pressure exceeds 40 psi.

PRESSURE GAUGE/DAMPER

Use gauge capable of reading double the pump working pressure. Use a gauge damper. It protects the gauge needle against pressure surges and provides easier reading.

RECOMMENDED INSTALLATION FOR HYPRO LOW CAPACITY PISTON PUMPS TO 4 GPM . . .

HYPRO SERIES 5500 (to 4 GPM) IS SHOWN. BASIC INSTALLATION ALSO APPLIES TO SERIES 5000 AND 5300.

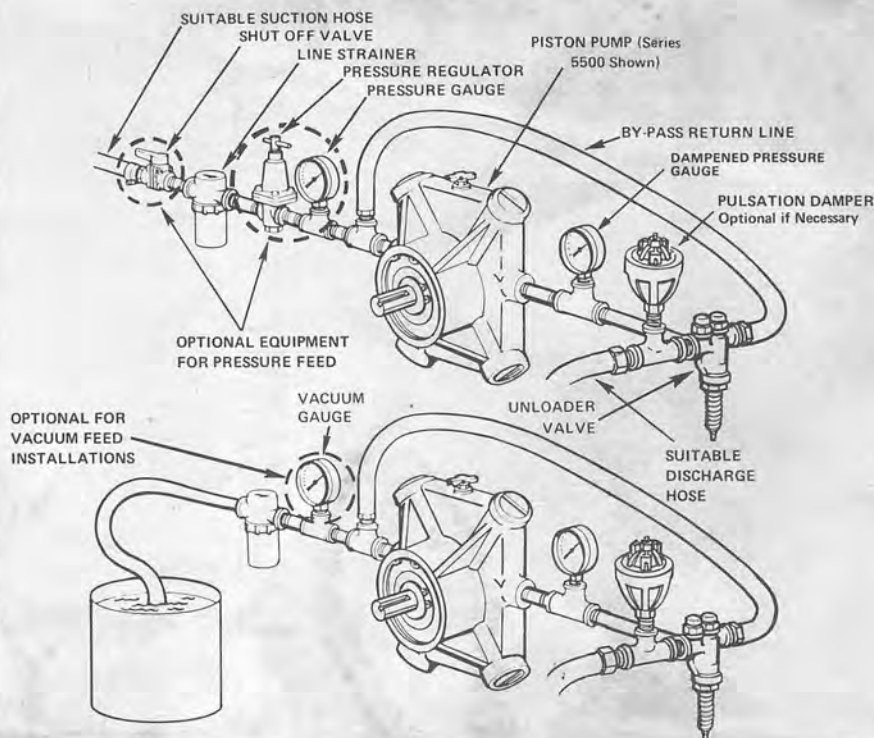


Fig. 4

RECOMMENDED INSTALLATION FOR HYPRO HIGH VOLUME PISTON PUMPS TO 25 GPM . . .

HYPRO SERIES 5400 (to 25 GPM) IS SHOWN. BASIC INSTALLATION ALSO APPLIES TO SERIES 5200 PISTON PUMP (10 GPM)

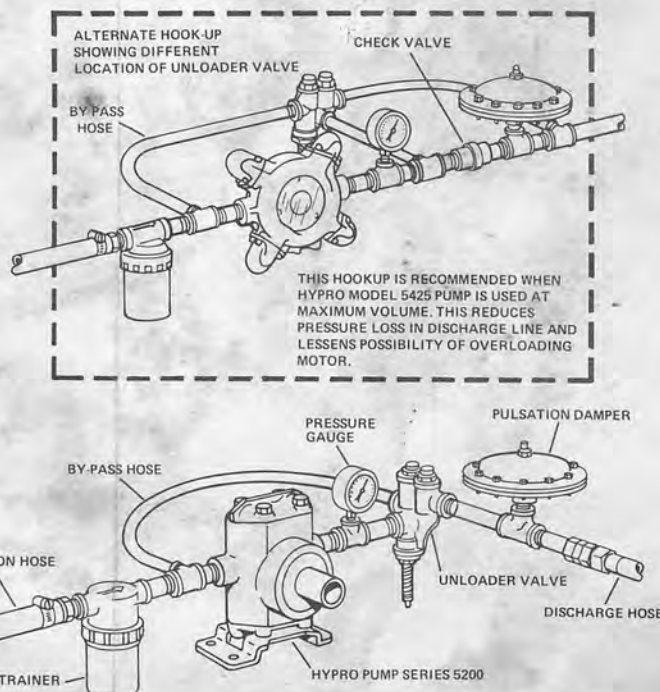


Fig. 5

OPERATING INSTRUCTIONS

PRIMING

If liquid is below level of pump, some means should be provided in installation to prime pump — such as a Riser Pipe. If there is a suction lift use a Foot Valve or Check Valve to hold prime. In general, keep suction lift to minimum and avoid unnecessary bends in suction line. Before starting pump, make sure air bleeder valve or spray gun is open — or unloader valve is adjusted to its lowest pressure. After starting pump, open and close gun several times if necessary to aid priming the pump. If pump does not prime within a few seconds, stop motor and inspect installation for suction line leaks or obstructions. Make sure that strainer is not clogged. Be sure that suction line is not obstructed, kinked or blocked (Fig. 6).

To further aid priming of the pump, install a bleeder valve (Hypor Part No. 3340-4) near pump discharge to bleed off air (Fig. 7). Valve is built into top of Series 5500 pump. Open bleeder valve by turning clockwise. When liquid flows from bleeder valve, pump is primed. Close bleeder valve. After pump is running adjust unloader valve to desired pressure.

If pump is to operate several hours at a time, check frequently for (1) adequate liquid supply. (Pump must not run dry for more than 30 seconds). (2) Temperature rise. Over heating is harmful to bearings and piston cups.

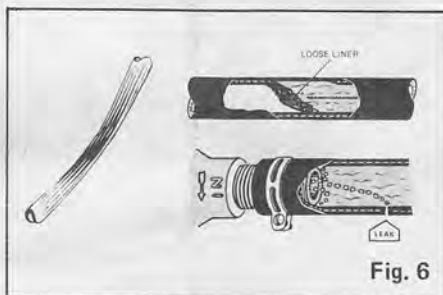


Fig. 6

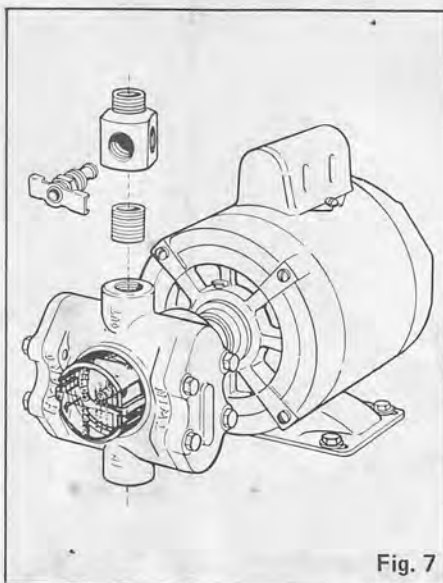


Fig. 7

CARE OF PUMP

Your pump will last longer and give best performance when properly taken care of. Proper pump care depends a lot on the liquid being pumped and when pump will be used again. In the normal car wash or detergent cleaning installation (where each application is followed by a clear water rinse) the pump will be kept clean.

Generally, after each use, flush pump with a neutralizing solution for the liquid just pumped. Follow with a clear water rinse. This is especially important for corrosive chemicals. Then flush out pump with a 50% solution of automotive radiator anti-freeze (ethylene glycol type such as Prestone, Zerex, etc.) containing a rust inhibitor... or use a commercial rust-inhibitor such as FLUID FILM.

While this flushing is not absolutely necessary for short periods of idleness (as over night) it is good practice to clean the pump after each use to prevent deposits from forming and damaging the pump. The anti-freeze not only coats the interior of the pump with an inhibitor, but acts as a lubricant as well, keeping valves from sticking — and protecting against any remaining moisture freezing in cold weather.

For infrequent use and before long periods of storage, drain pump thoroughly. Open any drain plugs, remove suction hose from liquid and run pump "dry" from 20 to 30 seconds (not longer). Then, plug both ports to keep out air until pump is used again.

LUBRICATION SCHEDULE

Use a small, low-cost push type gun such as illustrated in figure 10 to grease Hypor Series 5200, 5300, 5400 and 5500 Piston Pumps. (Trimline-Series 5000 is crankcase lubrication.) DO NOT USE AIR-POWERED OR HAND LEVER OPERATED GREASE GUNS as they develop too much pressure.

Location of greasing points and lubrication schedules vary. Refer to the table below for information concerning your pump.



SERIES 5000 (TRIMLINE) LUBRICATION

Fill crankcase with 12 fluid ounces of good grade automatic transmission oil. Pour oil into hole provided for oil level gauge (dipstick). Check regularly and add oil as necessary to keep level between the two marks (steps) on the gauge. Change oil every 500 hours of operation or six months, whichever comes first.

CAUTION: Check for excessive leakage from weep holes in side of pump. Excessive leakage can cause contamination of the crankcase. Weep holes must be kept open. If they should become clogged or plugged, water can work its way into the crankcase.

If water trickles from the weep holes more often than every 15 seconds, excessive leakage is indicated and piston seals should be replaced.

The automatic transmission fluid in the crankcase should always appear clear and pink on the dipstick. If the lubricant appears cloudy or milky with a pink color, the crankcase is contaminated with water. This indicates piston seal leakage and seals should be replaced as well as the lubricant.

LUBRICATION CHART — SERIES 5200, 5300, 5400, 5500

Pump Series	Grease Points	Where Located	How Often	Type of Grease *	Other Information
5200	1	Grease fitting on cam bearing.	Every 100 hours* of use or monthly — whichever comes first.	Moly-Lithium No. 2 wheel bearing grease.	With a screwdriver or flat tool apply a generous dab of grease to outer diameter surface of cam bearing at top and bottom — where bearing contacts connecting rod. Do not grease excessively. Check periodically and scrape out (do not WASH out) any excess grease from pump cavity.
5300	1	Grease fitting on cam bearing.	Every 100 hours* of use or monthly — whichever comes first.	Moly-Lithium No. 2 wheel bearing grease.	
5400	2	(1) Grease fitting on cam bearing.	Daily	Moly-Lithium No. 2 wheel bearing grease.	
		(2) Grease fitting on main bearing housing.	Weekly	Moly-Lithium No. 2 wheel bearing grease.	
5500	1	Grease fitting on cam bearing.	Daily	Moly-Lithium No. 2 wheel bearing grease.	

*EXCEPTION: In applications where FDA approval is required, use one of these greases: Chevron FM#2, Mobile FM#2, Keystone (Penwalt Corp.) Nevastane SP Medium. Lubricate every 50 hours or monthly.

Performance — piston pumps

			100 PSI		200		400		500		600		800		1000		1200		Length	Width	Height	Shaft Height	Shaft Diameter	Port. Size NPT*
Series	Model	RPM	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP						
5000	B5041	1825	4.18	.23	4.15	.57	4.09	1.05	4.06	1.28	4.04	1.52	4.0	2.0	3.97	2.48			8 ³ / ₈	6	9 ¹ / ₃₂	2 ¹ / ₁₆	1	¹ / ₂ NPT
5200	5206	600	5.84	.60	5.83	.90	5.80	1.78											5 ¹¹ / ₁₆	Series 5200 Solid Shaft Models: 6 ³ / ₈ 7 ¹ / ₁₆ 4 ¹ / ₁₆ 1 ³ / ₄ NPT				
	5210	600	10.55	1.19	10.41	1.59	10.18	2.83											6 ⁵ / ₁₆	6 ³ / ₈	7 ¹ / ₁₆	4 ¹ / ₁₆	PTO	³ / ₄ NPT
5300	5315	1800	1.61	.23	1.60	.34	1.55	.57	1.51	.67									All Series 5300, 500 psi Solid Shaft Models: 5 ¹⁹ / ₃₂ 5 ⁵ / ₈ 6 ¹³ / ₁₆ 3 ¹ / ₂ ⁵ / ₈ ¹ / ₂ NPT					
	5320	1800	2.26	.32	2.25	.44	2.21	.66	2.20	.79									All Series 5300, 500 psi Hollow Shaft Models: 5 ⁷ / ₃₂ 5 ⁵ / ₈ 5 ¹ / ₂ 2 ³ / ₄ ⁵ / ₈ (ID) ¹ / ₂ NPT					
	5321	1750	2.23	.33	2.22	.49	2.22	.77	2.22	.88	2.20	1.04	2.20	1.32	2.15	1.53			5 ⁹ / ₁₆	5 ⁵ / ₈	Solid Shaft 5321 6 ³ / ₈ 3 ¹ / ₂ ⁵ / ₈		¹ / ₂ NPT	
	5325	1800	2.62	.35	2.60	.46	2.56	.67	2.55	.79									5 ³ / ₁₆	5 ⁵ / ₈	Hollow Shaft 5321 6 ¹ / ₄ 3 ³ / ₈ ⁵ / ₈ (ID)		¹ / ₂ NPT	
	5330	1800	3.26	.46	3.22	.63	3.12	.94	3.10	1.10														
5400	D5412R	600	11.0	1.32	11.0	1.80	11.0	3.17	11.0	3.94	11.0	4.71	11.0	6.30	11.0	7.71	11.0	8.95	11 ¹ / ₁₆	11	Series 5412 13 ¹ / ₂ 8		1 ¹ / ₄	1 ¹ / ₄ NPT
	5425	600	26.3	3.2	26.3	4.8	26.3	8	26.3	9.6	26.3	11.1							11 ¹ / ₁₆	11 ¹ / ₄	Series 5425 13 ³ / ₈ 8 (w/base) (w/base)		1 ¹ / ₄	1 ¹ / ₄ NPT
5500	5540	900	2.1	.28	2.1	.42	2	.68	2	.82	2	.95	2	1.2					6 ¹ / ₈	9 ¹ / ₂	8 ¹ / ₄	4 ⁵ / ₃₂	1	¹ / ₂ NPT
		1200	2.8	.41	2.8	.56	2.8	.90	2.8	1.1	2.8	1.2	2.8	1.6					4 ⁷ / ₁₆	9 ¹ / ₂	8 ¹ / ₄	4 ⁹ / ₃₂	⁷ / ₈ (ID)	¹ / ₂ NPT
		1450	3.4	.50	3.4	.67	3.3	1.1	3.3	1.3	3.3	1.5	3.3	2.0					4 ⁷ / ₁₆	9 ¹ / ₂	8 ¹ / ₄	4 ⁵ / ₃₂	1 ¹ / ₈ (ID)	¹ / ₂ NPT
		1800	4.1	.68	4.1	.85	4.1	1.4	4.0	1.6	4.0	1.8	4.0	2.3					4 ⁷ / ₁₆	9 ¹ / ₂	8 ¹ / ₄	4 ⁵ / ₃₂	28 mm (ID)	¹ / ₂ NPT
5900	5920	600	20.0	1.95	19.5	3.30	18.5	5.70	18.5	6.75								7 ¹⁵ / ₁₆	9 ⁵ / ₈	11	5 ¹¹ / ₁₆	1 ¹ / ₄	1 ¹ / ₄ NPT	

PISTON CUPS TO USE WHEN PUMPING THESE LIQUIDS:

Liquid	Rubber Piston Cup	Leather Piston Cup
Insecticides		X
Herbicides		X
Fungicides		X
Aromatic Solvents		X
Water	X	
Soaps	X	
Detergent Solutions	X	

For special applications, consult factory.

TABLE FOR DETERMINING SYSTEM PRESSURE LOSS

Flow Rate (Pump output)	2 gal./min. pump				3 gal./min. pump			
Nominal Size of Pipe or Hose	$\frac{1}{8}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{1}{8}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "
(a) Multiply number of elbows by	26	6.4	1.4	.4	57	14	3	.9
(b) Multiply number of feet of pipe by	1.3	.32	.07	.02	2.8	.69	.15	.045
(c) Multiply number of feet of hose by	—	1.8	.24	.06	—	3.8	.5	.12
<p>Find values of (a), (b) and (c) for your installation and add them together. This will give you the total pressure drop through the system when it is discharging the full output of the pump (two or three gallons per minute).</p> <p>For example: (Pump with two gallons per minute flow)</p> <p>Pressure drop in six $\frac{1}{4}$" elbows = $6 \times 6.4 = 38.4$ lbs./sq. in.</p> <p>Pressure drop in 40 ft. $\frac{1}{4}$" pipe = $40 \times .32 = 12.8$ lbs./sq. in.</p> <p>Pressure drop in 20 ft. $\frac{1}{4}$" hose = $20 \times 1.8 = 36.0$ lbs./sq. in.</p> <p>Total pressure drop in system = $38.4 + 12.8 + 36.0 = 87.2$ lbs./sq. in. (between pump and nozzle)</p> <p>Notice that number of pipe elbows and length and size of the hose are often more important than the pipe length in determining the overall pressure drop.</p>								

Hyp
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